

## C L A I M S

1. A catheter (4) for medical applications, suitable for being inserted into a duct (5) comprising a first vessel (6) and a second vessel (7) which branches 5 off from said first vessel (6), the catheter (4) comprising a catheter body (10) which extends from a proximal end (12) to a distal end (16), said catheter body (10) comprising a main cavity (20), bounded by a lateral wall (28), which passes through the catheter body 10 (10) between the proximal end (12) and the distal end (16), suitable for receiving a guide cable for the insertion of the catheter (4) into the first vessel (6), and at least one opening (24), disposed on the lateral wall (28) at the distal end (16) and suitable for 15 perfusing a substance, characterized in that the catheter body (10), at a portion of the lateral wall (28) comprised between said at least one opening (24) and said distal end (16), comprises first and second occluding means (60, 62), wherein the 20 first occluding means (60) are suitable for at least partially occluding a gap (63) between the catheter body (10) and an inner wall (32) of the first vessel (6), and the second occluding means (62) can be associated internally with said main cavity (20) and are suitable 25 for at least partially occluding said main cavity (20),

said first and second occluding means (60, 62) defining a preferred direction of outflow of a fluid from the main cavity (20) of the catheter body (10) to the second vessel (7), through said at least one opening (24) of the 5 catheter body (10).

2. A catheter according to claim 1, wherein said first and second occluding means (60, 62) co-operate with each other to create a resistance to the passage of fluid through said distal end (16), favouring an outflow of 10 fluid through said at least one opening (24).

3. A catheter according to claim 1 or 2, wherein said first and second occluding means (60, 62), at a portion of the catheter body (10) comprised between said at least one opening (24) and said distal end (16), 15 substantially effect the occlusion of the first vessel (6) into which the catheter (4) is inserted, so as to direct a flow of fluid into the second vessel (7), through said at least one opening (24).

4. A catheter according to any one of the 20 preceding claims, wherein said first occluding means (60) comprise an inflatable element (64) positioned round the catheter body (10), said inflatable element (64), in a rest state, adhering substantially to the catheter body (10), and in a working state being substantially in 25 contact with an inner wall (32) of said first vessel (6).

5. A catheter according to claim 4, wherein said inflatable element (64) is in fluid connection with the proximal end (12) so as to be operable from said proximal end (12).

5 6. A catheter according to any one of the preceding claims, wherein said catheter body (10) comprises a secondary cavity (36), which extends from the proximal end (12) to the distal end (16) and is hermetically separated from said main cavity (20), said 10 secondary cavity (36) being in fluid connection with said first occluding means (60) so as to permit the actuation of said first occluding means (60).

7. A catheter according to claim 6, wherein said secondary cavity (36) is produced in a thickness of said 15 lateral wall (28) of said catheter body (10).

8. A catheter according to claim 6 or 7, wherein the catheter body (10) has an oval cross-section having a first pole (37') more pronounced than a second pole (37'') diametrically opposed to the first pole (37'), so that 20 the lateral wall (28), at the first pole (37'), receives said secondary cavity (36).

9. A catheter according to any one of the preceding claims, wherein said second occluding means (62) comprise an occluding body (68), suitable for being 25 introduced into said main cavity (20), and an insertion

cable (72) firmly connected to said occluding body (68) so as to allow the insertion of the occluding body (68) through the main cavity (20).

10. A catheter according to claim 9, wherein said 5 occluding body (68) is substantially spherical in shape.

11. A catheter according to claim 9, wherein said occluding body (68) is substantially frustoconical in shape.

12. A catheter according to any one of the 10 preceding claims, wherein said catheter body (10), at said distal end (16), comprises a portion with tapered profile (46) so as to reduce the cavity of the catheter body (10) at the distal end (16).

13. A catheter according to any one of the 15 preceding claims, wherein said second occluding means (62), at said distal end (16), comprise a membrane (76) suitable for at least partially occluding said main cavity (20) and having a hole (80) suitable for allowing the passage of the guide cable of said catheter (4).

20 14. A catheter according to claim 13, wherein said membrane (76) is firmly connected to the distal end (16) of the catheter body (10).

25 15. A catheter according to any one of the preceding claims, wherein said second occluding means (62) are made of a material suitable for being

sterilized.

16. A catheter according to any one of the preceding claims, wherein said at least one opening (24) is such that the area of the at least one opening (24) is 5 not less than the area of the cavity of the distal end (16) of the catheter body (10).

17. A catheter according to any one of the preceding claims, wherein said openings (24) are disposed substantially in a helical direction with respect to a 10 main axis of extension (X) of the catheter body (10).

18. A catheter according to any one of the preceding claims, comprising, at said proximal end (12), a main pathway (96), suitable for receiving said second occluding means (62) and fluidly connected to said main 15 cavity (20).

19. A catheter according to claim 18, wherein said main pathway (96) comprises a threaded section (100) capable of producing a threaded connection with a corresponding threaded portion of said second occluding 20 means (62).

20. A catheter according to any one of the preceding claims, wherein said proximal end (12) comprises a secondary pathway (108), fluidly connected to said secondary cavity (36), and suitable for receiving at 25 the inlet a fluid for allowing the actuation of said

first occluding means (60).

21. A catheter according to any one of the preceding claims, wherein said proximal end (12) comprises an infusion pathway (112), fluidly connected to 5 said main cavity (20) and suitable for receiving at the inlet a fluid, so as to allow the flow of the fluid from the proximal end (12) to the distal end (16).

22. A method for the use of a catheter according to any one of the preceding claims, said catheter (4) 10 comprising first and second occluding means (60, 62) said method comprising the steps of:

- inserting the catheter (4) into a first vessel (6), by means of a guide cable, so that the distal end (16) of the catheter (4) passes beyond the branching (8) from 15 which starts the second vessel (7) into which it is intended to perfuse a substance;
- withdrawing the guide cable and inserting the second occluding means (62);
- actuating the first occluding means (60) so as to 20 occlude at least partially the gap (63) between the catheter body (10) and the inner wall (32) of the first vessel (6);
- injecting the substance into the main cavity (20) of the catheter (4) so as to direct the substance from the 25 at least one opening (24) of the lateral wall (28) of the

catheter body (10) to the bifurcation (8) from which the second vessel (7) starts.

23. The method of claim 22, wherein the first vessel is a subclavian artery and the second vessel is a  
5 mammary artery.